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In every one of the four plates we found the law between 2<sup>s</sup> and 8<sup>s</sup> most strongly confirmed, and can now establish its validity for all the Seed-plates No. 26 (within the limits of the probable errors). Beyond 8<sup>s</sup> the results obtained from our first plate are corroborated in the last plate only. In the second plate the proportionality goes as far as 16<sup>s</sup>, and in the third even to 64<sup>s</sup>, but in *no case does the proportionality go beyond 64<sup>s</sup>*.

The results so far obtained are, in toto :

*For the Seed-plates No. 26, the blackening of the film is proportional to the time of exposure within the limits of 2<sup>s</sup> and 8<sup>s</sup>, and may be so as far as 64<sup>s</sup>, but there is a [strong] probability that the proportions fall off after 8<sup>s</sup>.*

In order to determine the exact position of the limit at which the proportionality begins to fall off, additional plates will be exposed according to a plan which will enable us to compare the darker squares, also, without introducing large errors. Between 2<sup>s</sup> and 8<sup>s</sup>, however, the evidence for the validity of the law is already sufficient.

BERKELEY, CAL., November, 1889.

## THE LUNAR CRATER AND RILL—*HYGINUS*.

By EDWARD S. HOLDEN.

### [ABSTRACT.]

I have asked Mr. BARNARD to make positive enlargements on glass of one of our best Moon negatives. A negative of August 14, 1888 (made by Mr. BURNHAM), has thus been enlarged two times, and shows the Moon, therefore, exactly as it would appear in the principal focus of a telescope 1140 inches, or 95 feet, long.\* I find that I can use on this positive an eye-piece of one inch equivalent focus as a magnifier. That is, it is practicable to examine the lunar surface under perfect conditions of definition and illumination, and under a magnifying power of more than 1100 diameters, or, as if viewed by the naked eye, at a distance of 217 miles or so. This can be done whenever one pleases, and as long as one pleases.

As a test of the excellence of definition, I may mention a discovery which I have made on Mr. BARNARD'S enlargement. It is well known that MAEDLER (and others) have mapped the walls of the

\* The focus of our photographic lens is 570.2 inches.

*Hyginus* rill crossing the floor of the *Hyginus* crater. So far as I know, this has only been once seen. The observation is a delicate one, and could only be made when the sun is shining nearly in the direction of the preceding branch of the rill. The walls inside the crater are hardly more than 2000 yards apart, and their bright tops are not more than 200 to 220 yards wide. Yet they are plainly and obviously visible in this enlargement.

From this single example (among many others which could be given), it is possible to form a judgment of the results which a competent selenographer could draw from a series of our Moon negatives. I have no hesitation in saying that a two or three years' study of such a series would produce greater results than all the previous work of observers in this line, great as these results have been. Unfortunately, the limited force at the Lick Observatory will not permit us to undertake anything more than the production of the negatives themselves. By depositing sets of these at certain scientific centers, they will be sure, sooner or later, to be studied by competent observers who have the necessary leisure.

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PHYSICAL OBSERVATIONS OF *JUPITER* IN 1889.

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BY J. E. KEELER.

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[ABSTRACT.]

Mr. KEELER exhibited a series of twenty-four drawings of *Jupiter*, made during the opposition of 1889, with the thirty-six-inch equatorial of the Lick Observatory. The drawings were made on a large scale, the elliptical outline of the planet being  $3.50 \times 3.30$  inches, and were intended to show all the details that could be perceived with the telescope and transferred to paper in the limited time allowed by the rotation of the planet, (about fifteen or twenty minutes). All dimensions were mere eye estimates, but they had been checked by micrometer measurements and found to be fairly accurate. Reference was made to the extremely satisfactory views obtained with the great telescope and a *résumé* given of the different kinds of astronomical work in which the instrument had proved to be efficient.

The equatorial zone of *Jupiter* was brilliant white at the edges, with a salmon-pink central stripe, which the measurements showed to be a trifle south of the equator. From the edges of the zone